

Application No.: 10/521,173
Amendment under 37 CFR 1.111
Reply to Office Action dated April 8, 2008
July 8, 2008

AMENDMENTS TO THE DRAWINGS

Figs. 1 and 2 have been amended to label them "Prior Art".
Therefore, please replace this attached drawing sheet for the
original drawing sheet including Figs. 1 and 2.

Attachment: Replacement Drawing Sheet for Figs. 1 and 2

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REMARKS

By this amendment, Figs. 1 and 2 have been amended, claims 1-4 have been amended and new claims 5-10 have been added in the application. Currently, claims 1-10 are pending in the application.

Claims 2 and 4 were objected to because of the following informalities: the Examiner stated that the phrase "a power switch which controls emission and stop of the x-ray" should be changed to "a powered switch to control the amount of or to stop the emission of the x-rays". By this amendment, claims 2 and 4 have been amended to recite "a powered switch to control the amount of or to stop the emission of the x-rays" as the Examiner suggested. Applicants respectfully submit that the claims are now proper and this objection should be withdrawn.

Claims 1-2 were rejected under 35 USC 103(a) as being obvious over Mizuno et al. (JP 2000-167388) in view of Mizushima (JP 2951477).

This rejection is respectfully traversed in view of the amendments to the claims and the remarks below.

The present invention relates to a charging device of aerosol particles using an X-ray source for generating a soft X-ray (see page 1, lines 5-7 of the specification).

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As shown in Fig. 3, an X-ray emitting section 22 is arranged at an opening at a side of a chamber 21. The X-ray emitting section 22 emits X-rays from the middle of a left end of the cylindrical chamber. An inlet duct 23 for introducing the aerosols is arranged at an upper part of the chamber 21. A outlet duct 24 for exhausting the bipolar charged aerosols is arranged at the middle of the other end of the chamber. A rectifying plate 25 having a plurality of openings for rectification is arranged in the vicinity of the outlet duct 24. (see page 7, lines 13-22 of the specification).

In Fig. 6, a chamber 31 is formed by a cylindrical part 32 and electrodes 33, 34 for the upper surface and the lower surface. A direct current high-voltage power source 35 is connected between the upper and lower electrodes 33, 34, and an ammeter 36 is connected to the electrode 33 of the upper surface. An inlet duct 37 and a outlet duct 38 are arranged on the upper part of the chamber 31 at positions facing each other (see page 10, line 22 - page 11, line 4 of the specification).

By this amendment, independent claim 1 has been amended to recite "an X-ray emitting section which is arranged in the vicinity of said inlet duct facing said chamber and emits an X-ray having a main wavelength within a range of 0.13 nm to 2 nm".

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These claimed features are not shown or suggested by Mizuno et al. and Mizushima.

Mizuno et al. relate to the ion carrier type ionizing apparatus.

Mizuno et al. disclose an ionizing source 6 in the middle of the tube 1 and a shield part 9 with a plurality of partition walls 10.

Mizuno et al. do not disclose that an X-ray emitting section which is arranged in the vicinity of the inlet duct facing the chamber and emits an X-ray having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 1.

Also, applicants respectfully submit that Mizuno et al. do not disclose the X-ray emitting section is arranged in the vicinity of the inlet duct, outside the chamber.

For these reasons, it is believed that Mizuno et al. do not show or suggest the present claimed features of the present invention. Applicant also submits that Mizushima do not make up for the deficiencies in Mizuno et al.

Mizushima relates to an X-ray tube with a Beryllium window. Mizushima discloses that the Beryllium window is used as a window for the X-ray to penetrate the window.

Mizushima does not disclose an X-ray emitting section which is arranged in the vicinity of the inlet duct facing the chamber

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and emits an X-ray having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 1.

Applicants respectfully submit that Mizushima also do not disclose the X-ray emitting section is arranged in the vicinity of the inlet duct, outside the chamber.

It is therefore respectfully submitted that Mizuno et al. and Mizushima, individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

Claim 3 was rejected under 35 USC 103(a) as being obvious over Takao et al. (JP 2001-070743 in view of Mizushima. Also, claim 4 was rejected under 35 USC 103(a) as being obvious over Takao et al. as modified by Mizushima and further in view of Mizuno et al.

These rejections are respectfully traversed in view of the amendments to the claims and the remarks below.

By this amendment, independent claim 3 has been amended to recite "an electric field generation section which includes electrode plates arranged on both surfaces facing each other of said chamber and generates an electric field from an irradiating section to a non-irradiating section of an X-ray within said chamber; an X-ray emitting section which is arranged facing said

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chamber and emits an X-ray to said irradiating section of said chamber having a main wavelength within a range of 0.13 nm to 2 nm". These claimed features are not shown or suggested by Takao et al., Mizushima and Mizuno et al.

Takao et al. relate to a gas separation apparatus.

Takao et al. disclose that air containing impurity gas molecule components is introduced into a cylindrical chamber 11 through a gas inlet member 16 and the gases are ionized by α ray from a radiation source 17.

Takao et al. do not disclose an electric field generation section which includes electrode plates arranged on both surfaces facing each other of the chamber and generates an electric field from an irradiating section to a non-irradiating section of an X-ray within the chamber; and an X-ray emitting section which is arranged facing the chamber and emits an X-ray to the irradiating section of the chamber having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 3.

Applicants respectfully submit that the present invention discloses that the chamber consists of the irradiation section and non-irradiation section and X-ray is irradiated only to the irradiation section of the chamber.

On the other hand, Takao et al. do not disclose these two sections in the chamber.

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For these reasons, it is believed that Takao et al. do not show or suggest the present claimed features of the present invention. Applicant also submits that Mizushima and Mizuno et al. do not make up for the deficiencies in Takao et al.

Mizushima and Mizuno et al. do not disclose an electric field generation section which includes electrode plates arranged on both surfaces facing each other of the chamber and generates an electric field from an irradiating section to a non-irradiating section of an X-ray within the chamber; and an X-ray emitting section which is arranged facing the chamber and emits an X-ray to the irradiating section of the chamber having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 3.

It is therefore respectfully submitted that Takao et al., Mizushima and Mizuno et al., individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

Applicants also respectfully submit that the features claimed in dependent claims 2 and 4, which directly depend from independent claims 1 and 3, define over the prior art of record and allowance of these claims is respectfully requested.

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New dependent claim 5, which directly depends from independent claim 1, has been added in the application. New dependent claim 5 has been added to recite "a rectifying plate which is arranged in the vicinity of said outlet duct in said chamber, having a plurality of openings for rectifying air flow in said chamber". Applicants respectfully submit that this dependent claim defines over the prior art of record. Allowance of this claim is also respectfully requested.

Also, new dependent claim 6, which depends from dependent claim 4, has been added in the application. New dependent claim 6 has been added to recite "said inlet and outlet duct face each other". Applicants respectfully submit that this dependent claim defines over the prior art of record. Allowance of this claim is also respectfully requested.

Also, new dependent claim 7, which depends from dependent claim 4, has been added in the application. New dependent claim 7 has been added to recite "said electric field generation section comprises a direct current high voltage power source". Applicants respectfully submit that this dependent claim defines over the prior art of record. Allowance of this claim is also respectfully requested.

Also, new independent claim 8 has been added in the application. New independent claim 8 has been added to recite

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"an X-ray emitting section which is arranged closer to said inlet duct than said outlet duct, said X-ray emitting section facing said chamber and emits an X-ray having a main wavelength within a range of 0.13 nm to 2 nm". Applicants respectfully submit that this independent claim defines over the prior art of record because none of these references show an X-ray emitting section which is arranged closer to said inlet duct than said outlet duct. Allowance of this claim is also respectfully requested.

Also, new dependent claim 9, which depends from independent claim 8, has been added in the application. New dependent claim 9 has been added to recite "said X-ray emitting section includes a powered switch to control the amount of or to stop the emission of the X-ray". Applicants respectfully submit that this dependent claim defines over the prior art of record. Allowance of this claim is also respectfully requested.

Also, new dependent claim 10, which depends from independent claim 8, has been added in the application. New dependent claim 10 has been added to recite "a rectifying plate which is arranged in the vicinity of said outlet duct in said chamber, having a plurality of openings for rectifying air flow in said chamber". Applicants respectfully submit that this dependent claim defines over the prior art of record. Allowance of this claim is also respectfully requested.

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In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,


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